Microgravity Biotechnology

Principal Investigator's Survival Guide

for
Ground-Based Investigations

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Dec. 7, 1998

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1. Introduction

Congratulations on your selection as a Principal Investigator (PI) by the NASA Headquarters Microgravity Research Division (MRD). Your investigation will be managed by the Microgravity Science and Applications Program office at Marshall Space Flight Center (MSFC) in Huntsville, Alabama. You and your investigation team will be assigned an MSFC Project Scientist and Project Manager to be your NASA points of contact during the investigation process.

To help you understand the NASA process, this *Principal Investigator's Survival Guide* outlines the ground-based investigation process and its procurement and program control requirements (a follow-on *Guide* is provided for flight investigators). This is not an exhaustive review of NASA procedures or regulations, nor does it supersede instructions in your grant or contract. Further, no specific timetables are given as you and your NASA contacts must develop these as your investigation proceeds.

Revisions will be published as needed. In some cases, we will send only change pages with affected sections noted by a solid bar as shown on the left. However, *all investigators are advised to read this entire Guide as a number of changes have been made since it was first published in 1995; thus, changes are not marked in this edition*.

You are welcome to comment on or suggest changes to *Principal Investigator's Survival Guide*. Please address them to:

Manager, Microgravity Systems Office—MG20
Marshall Space Flight Center
Huntsville, AL 35812

/s/

Ron Porter, Biotechnology Program Manager

/s/

Buddy Guynes, Biotechnology Project Manager

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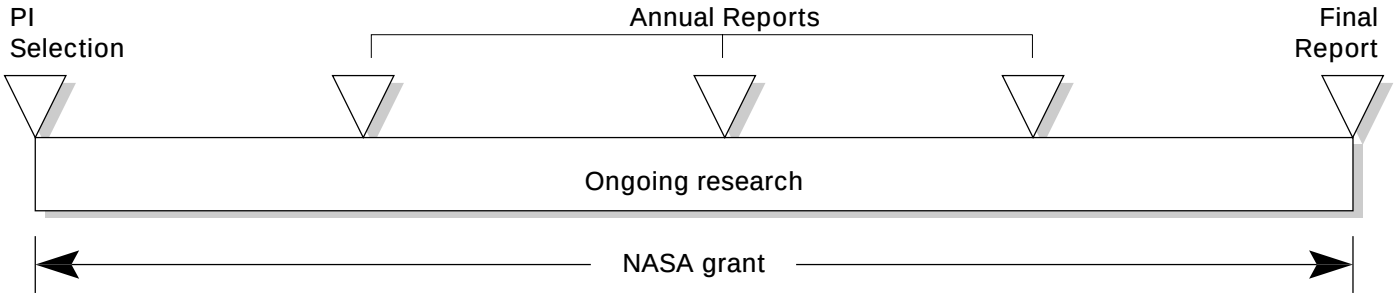
2. Investigation Process

NASA scientific programs normally follow one of two procedures, the ground-based research program, which is a general research effort, and a flight development program, which is more rigorous and has specific goals and objectives leading to an experiment in microgravity.

Your ground-based research program proceeds under the authority of a NASA Grant or cooperative agreement (see page 7). The grant is accompanied by an increment of funds sufficient to begin the research with the balance to be provided as needed, based on information provided in quarterly financial reports (Part 4, Program Control; page 6).



Timeline for a NASA Grant.

By Aug. 1 of each year, you must submit a report to your project manager for inclusion in the *MRPO Task Book* and to serve as an annual progress report for your grant. The *Task Book* is the single best source of general information for the Microgravity Research Division's science program. In addition, the data are used in a variety of other ways, including reports to Congress and to upper NASA management. It is very important that these data be correct and submitted on time. A blank form and sample citations page are provided on pages 11-14. This input will satisfy the requirement for both the *Task Book* and annual reporting.

Project Manager
Buddy Guynes
buddy.guynes@msfc.nasa.gov
Grant/Contracts Manager
Elaine Hamner
elaine.hamner@msfc.nasa.gov
Task Book Manager
Nancy Bennett
nancy.bennett@msfc.nasa.gov

The report must include a synopsis of the investigation research to be accomplished with the next year's money, as well as a performance report of the past year's research. This performance report shall include, but not be limited to, significant ac-

complishments, science gained, and obstacles encountered. You may be required to make a formal presentation to MSFC project scientist and project management. This process will proceed on an annual cycle until the scope of the initial NASA selection is accomplished, or the project scientist deems the investigation complete. Additionally, investigators may be required to attend a NASA-sponsored science conference once every year or every other year.

All Principal Investigators, regardless of the status of their investigation, must submit an entry for the *Microgravity Research Task Book* at the end of each fiscal year.

3. Procurement Process

The MSFC Procurement Office will write, negotiate, and administer your grant. A representative of the Procurement Office will contact your organization's business office shortly after your selection as a PI.

The Procurement Office will review your NASA Research Announcement (NRA) proposal to see that you have provided adequate support for your costs and to ensure that all required certifications and information have been submitted in order to award your grant. This type of reporting is required by law. During this review, your business office may be contacted for more information. To speed this process, please provide a contact name plus e-mail address and phone number.

At the same time you receive your acceptance letter, MSFC should also receive authority to place you under a grant. In most cases, MSFC can award a grant within 45 days of receiving that authority. Of course, the exact time it takes depends on characteristics of the specific NRA proposal and the need for additional information. We will make every effort to award your grant within 45 days.

Those investigators in the Flight Development Program should expect to transition from a grant to a contract following the RDR. The switch to a contract is necessary because the Government can place detailed requirements only on an organization under a contract. A grant does not contain a Statement of Work or any performance or design specifications. It is simply an agreement between the Government and an organization to perform research. This means it is very important for you to communicate frequently with your MSFC team to ensure that milestones and reviews are successfully completed and that research progresses within the system described in this document. Those of you in the Flight Development Program will be provided information at a later date on transitioning from your grant to a contract.

Current provisions governing your grant

Key features of NASA grants

- Grants typically are funded in one-year increments. If your grant is for multiple years, stay in contact with your business office and NASA to ensure that additional work will continue without an interruption in funding.
- Payments are made quarterly in advance of costs and based on projected expenses for the next three months. If costs are higher than expected, you may apply to recover in the next quarter provided that you stay within the funding approved for that particular year of your grant (See SF272 on page 9)
- Grants are not managed by negotiated line item of cost. This allows you freedom to rebudget, within your funding total, in any manner that lets you complete your research best. However, changes to subcontracts or equipment require prior approval of the grants office.

are in the Grant and Cooperative Agreement Handbook, NPG 5800.1D, dated July 23, 1996, which is available on the Internet at

http://ec.msfc.nasa.gov/hq/grcover.htm

Your organization's business office should obtain a copy and have a good understanding of the handbook. You may contact your MSFC Procurement representative for assistance as necessary.

Your technical primary points of contact are the Project Scientist and Project Manager under a NASA Grant. However, do not hesitate to contact your procurement representative when you have questions or need information.

4. Program Control

We close this guide with a brief introduction to the basic program control requirements for a NASA project. It is not an exhaustive treatment of all requirements. Opportunities will be made available for training on specific aspects of the various functions of program control.

NASA's program control responsibilities provide for the formal planning, initial funding, and monitoring of resource plans and spending against those plans. In general, you are responsible for the initial justification for your funding requirements and for the effective use of your resources—primarily funding and labor.

NASA funding is determined through a budget cycle known as a Program Operating Plan (POP) which provides funding for approved programs. Each PI, university, or contractor is expected to play a role in the POP process.

You are required to submit quarterly financial reports like the sample shown here. The requirements for reporting cost and technical status are required by the NASA Grant Handbook and are provided by reference in the grant.

Standard Form 272, Federal Cash Transactions Report, is used to request money and to give the status of Federal funds. The report can be used for ground-based or flight programs using grant funding. This report will provide the status of funding. Costs are "run in" for more accurate project costing—last quarter's actual costs and next quarter's estimate of monthly costs. For the Business Management Office, Form 272 is the basis for planning and forecasting the project's status. MSFC submits the project status report to NASA Headquarters each month. The 272 is required at the end of each federal quarter. *Future PI funding levels are determined by costs submitted on the 272.*

Important note

It is critical that you submit your actual costs for each completed quarter and your forecast costs for the succeeding quarter so that MSFC can efficiently plan and use its limited resources. Failure on your part to provide this information may result in a reduction or loss of your funding.

FEDERAL CASH TRANSACTIONS REPORT

(See instructions on the back. If report is for more than one grant or assistance agreement, attach completed Standard Form 272-A.)

OMB APPROVAL NO. 0348-0003

1. Federal sponsoring agency and organizational element to which this report is submitted: NASA/Marshall Space Flight Center

2. RECIPIENT ORGANIZATION
Name
Number and Street
City, State, and ZIP Code

4. Federal grant or other identification number
5. Recipient's account number or identifying number
8. Payment Vouchers credited to your account
7. Last payment voucher number

Give total number for this period

8. Payment Vouchers credited to your account
9. Treasury checks received *(whether or not deposited)*

3. FEDERAL EMPLOYER IDENTIFICATION NO.

10. PERIOD COVERED BY THIS REPORT
FROM *(month, day, year)*
TO *(month, day, year)*

11. STATUS OF FEDERAL CASH *(See specific instructions on the back)*

a. Cash on hand beginning of report period	$
b. Letter of credit withdrawals	
c. Treasury check payments	
d. Total receipts *(Sum of lines b and c)*	
e. Total cash available *(Sum of lines a and d)*	
f. Gross disbursements	
g. Federal share of program income	
h. Net disbursements *(Line f minus line g)*	
i. Adjustments of prior periods	
j. Cash on hand end of period	$

12. THE AMOUNT SHOWN ON LINE 11j, ABOVE, REPRESENTS CASH REQUIREMENTS FOR THE ENSUING _____ *Days*

13. OTHER INFORMATION

a. Interest income	$
b. Advances to subgrantees or subcontractors	$

14. REMARKS *(Attach additional sheets of plain paper, if more space is required)*
Include 4-month forecast: Month 1 $ Month 2 $ Month 3 $ Month 4 $

15. CERTIFICATION

I certify to the best of my knowledge and belief that this report is true in all respects and that all disbursements have been made for the purpose and conditions of the grant or agreement

AUTHORIZED CERTIFYING OFFICIAL

SIGNATURE | DATE REPORT SUBMITTED

TYPED OR PRINTED NAME AND TITLE | TELEPHONE *(Area Code, Number, Extension)*

THIS SPACE FOR AGENCY USE

NSN 7540-01-016-5434
272-103

STANDARD FORM 272 (Rev. 2-92)
Prescribed by Office of Management and BVudget
Cir. No. A-102 and A-110

Form 272 must be filed at the end of each Federal quarter and cover only that quarter. If your contract starts in the middle of a month, then your report should reflect expenditures from award date through the end of the Federal quarter. This keeps all reports in step with the Federal fiscal calendar. A full-size copy of Form 272 (including a request for a 4-month forecast) is provided on pages 9-10. This form applies only to ground-based investigations.

Appendices

To make the guide easier to read, we have placed details of reviews and forms in seven appendices. These are not optional pages, bout contain materials that will be vital to successful completion of your project. Of special importance are the Form 272 Federal Cash Transactions Report and the annual Data Update Form. These must be filed in a timely manner to ensure funding.

1: Acronyms & Definitions
2: Form 272, Federal Cash Transactions Report
3: Data Update Form

Appendix 1
Acronyms & Definitions

ATP	Authority to Proceed
CDR	Critical Design Review
COTR	Contracting Officer's Technical Represenmtative
DS	Discipline Scientist
ES	Enterprise Scientist
KSC	Kennedy Space Center, Florida
MRD	Microgravity Research Division
MRPO	Microgravity Research Program Office
MSAD	Microgravity Science and Applications Division
MSFC	Marshall Space Flight Center, Huntsville, Alabama
NASA	National Aeronautics and Space Administration, Washington, D.C.
NRA	NASA Research Announcement
OLMSA	Office of Life and Microgravity Sciences and Applications
PDR	Preliminary Design Review
PI	Principal Investigator
PM	Program Manager
POP	Program Operating Plan
PS	Project Scientist
PSR	Preship Review
RDR	Requirements Definition Review
SCR	Science Concept Review
SOW	Statement of Work

Contract: Mutually binding legal relationship obligating the seller to furnish supplies or services, and the buyer to pay for them.

Cooperative Agreement: Legal instrument with the same basis as a grant, but anticipating substantial involvement between NASA and the recipient during the performance of the activity.

Grant: Legal instrument where the principal purpose is the transfer of anything of value to the recipient to accomplish a public purpose of support or stimulation as authorized by a Federal statute.

FEDERAL CASH TRANSACTIONS REPORT

(See instructions on the back. If report is for more than one grant or assistance agreement, attach completed Standard Form 272-A.)

OMB APPROVAL NO. 0348-0003

1. Federal sponsoring agency and organizational element to which this report is submitted
NASA/Marshall Space Flight Center

2. RECIPIENT ORGANIZATION

Name

Number and Street

City, State, and ZIP Code

4. Federal grant or other identification number	5. Recipient's account number or identifying number
8. Payment Vouchers credited to your account	7. Last payment voucher number

Give total number for this period

8. Payment Vouchers credited to your account	9. Treasury checks received *(whether or not deposited)*

10. PERIOD COVERED BY THIS REPORT

3. FEDERAL EMPLOYER IDENTIFICATION NO.	FROM *(month, day, year)*	TO *(month, day, year)*

11. STATUS OF FEDERAL CASH *(See specific instructions on the back)*		
	a. Cash on hand beginning of report period	$
	b. Letter of credit withdrawals	
	c. Treasury check payments	
	d. Total receipts *(Sum of lines b and c)*	
	e. Total cash available *(Sum of lines a and d)*	
	f. Gross disbursements	
	g. Federal share of program income	
	h. Net disbursements *(Line f minus line g)*	
	i. Adjustments of prior periods	
	j. Cash on hand end of period	$

12. THE AMOUNT SHOWN ON LINE 11j, ABOVE, REPRESENTS CASH REQUIREMENTS FOR THE ENSUING *Days*	13. OTHER INFORMATION	
	a. Interest income	$
	b. Advances to subgrantees or subcontractors	$

14. REMARKS *(Attach additional sheets of plain paper, if more space is required)*

Include 4-month forecast: Month 1 $ Month 2 $ Month 3 $ Month 4 $

15. CERTIFICATION

I certify to the best of my knowledge and belief that this report is true in all respects and that all disbursements have been made for the purpose and conditions of the grant or agreement	AUTHORIZED CERTIFYING OFFICIAL	SIGNATURE	DATE REPORT SUBMITTED
		TYPED OR PRINTED NAME AND TITLE	TELEPHONE *(Area Code, Number, Extension)*

THIS SPACE FOR AGENCY USE

INSTRUCTIONS STANDARD FORM 272 (BACK) (Rev 2-92)

Public reporting burden for this collection of information is estimated to average 120 minutes per response, including time for maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0000), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

Please type or print legibly. Items 1, 2, 8, 9, 10, 11d, 11e, 11h, and 15 are self- explanatory, specific instructions for other items are as follows:

Item/Entry:

3. Enter employer identification number assigned by the U.S. Internal Revenue Service or the FICE (institution) code.

If this report covers more than one grant or other agreement, leave Items 4 and 5 blank and provide the information on Standard Form 272-A, Report of Federal Cash Transactions—Continued: otherwise:

4. Enter Federal grant number, agreement number, or other identifying numbers if requested by sponsoring agency.

5. This space reserved for an account number or other Identifying number that may be assigned by the recipient.

6. Enter the letter of credit number that applies to this report. If all advances were made by treasury check, enter “NA” for not applicable and leave items 7 and 8 blank.

7. Enter the voucher number of the last letter-of-credit payment voucher (Form TUS 5401) that was credited to your account.

11a. Enter the total amount of Federal cash on hand at the beginning of the reporting period including all of the Federal funds on deposit, imprest funds, and undeposited Treasury checks.

11b. Enter total amount of Federal funds received through payment vouchers (Form TUS 5401) that were credited to your account during the reporting period.

11c. Enter the total amount of all Federal funds received during the reporting period through Treasury checks, whether or not deposited.

11f. Enter the total Federal cash disbursements. made during the reporting period, including cash received program income. Disbursements as used here also Include the amount of advances and payments less refunds to subgrantees or contractors, the gross amount of direct salaries and wages, including the employee’s share of benefits if treated as a direct cost, interdepartmental charges for supplies and services, and the amount to which the recipient is entitled for indirect costs.

11g. Enter the Federal share of program income that was required to be used on the project or program by the terms of the grant or agreement.

11i. Enter the amount of all adjustments pertaining to prior periods affecting the ending balance that have not been included in any lines above. Identify each grant or agreement for which adjustment was made, and enter an explanation for each adjustment under “Remarks.” Use plain sheets of paper if additional space is required.

11j. Enter the total amount of Federal cash on hand at the end of the reporting period. This amount should include all funds on deposit, imprest funds, and undeposited funds (line e, less line h, plus or minus line i).

12. Enter the estimated number of days until the cash on hand, shown on line 11j, will be expended. If more than three days cash requirements are on hand, provide an explanation under “Remarks” as to why the draw down was made prematurely, or other reasons for the excess cash. The requirement for the explanation does not apply to prescheduled or automatic advances.

13a. Enter the amount of interest earned on advances of Federal funds but not remitted to the Federal agency. If this includes any amount earned and not remitted to the Federal Sponsoring agency for over 60 days. explain under “Remarks.” Do not report Interest earned on advances to States.

13b. Enter amount of advance to secondary recipients included in item 11h.

14. In addition to providing explanations as required above, give additional explanation deemed necessary by the recipient and for information required by the Federal sponsoring agency in compliance with governing legislation. Use plain sheets of paper if additional space is required.

Appendix 3
Data update form

(note: may be copied as needed)

FY98 Data Update Form
Microgravity Research Division

PI's Last Name **First Name** **Middle Initial** **Prefix** **Suffix**

Affiliation

Phone: **Fax:** **E-mail:**

Address :

Task Research Title

Monitoring Center	MSFC	NAG number
Research type	Ground — Flight	Discipline
Initiation date		Expiration date

Degree	Students	Degrees granted
B.S.		
M.S.		
Ph.D.		
Totals		

Continues on next page

Co-Investigator name	Co-Investigator affiliation

Impact on America

This section has been added so that we can better understand the impact that NASA funded microgravity research has on America. To do this, we have included several new fields that we believe best capture this impact. All of the information provided should be for the current fiscal year only.

Industrial Affiliates
Please list any industry research contacts you may have

Who is using the results of your research?

Have you developed any innovative technologies, and if so, what are they?

Where have your recent graduate students found employment?

Acronyms (Please list and define any acronyms associated with your project)

Number of times that your work has appeared in the popular press?

Number of times that your work has appeared on a magazine cover?

PI's are asked to submit the following information for each investigation

Task Objective

Task Description

Task Significance

Task Progress (*Needs to be updated each year*)

Bibliography
Please list citations for FY 1998 only (see next page for sample listing)

FY98 Bibliographic Citations By NASA MSAD Task Pi's
(Oct 1, 1997 - Sept. 30, 1998 **0nly**)

Please do not include in press or submitted publications—include only those publications that actually appeared in FY98. If you are creating this list from scratch, please try to follow the examples below, including noting what each type of bibliographic citation is. If you have more than a single task being funded by NASA Marshall Space Flight Center, make sure that you don't lump all your bibliographic citations into one long list (divide the citations into separate lists and keep them with the associated task). If you include a citation that doesn't cite the pi as an author, make sure that the Co-I is also listed on the task information sheet.

Book
Andrews, J.B. "Solidification of Immiscible Alloys" in "Immiscible Liquid Metals and Organics." L. Ratke, ea., DGM Informationsgesellschaft. Verlag Press, 199-222, 1993.

Journal
Feng, H.J., and Moore, J.J. Combustion synthesis of high performance ceramic-metal composites. *High Performance Metal and Ceramic Matrix Composites*, TMS, K. Upadhya, ed., 157-174 (1994).

Journal
Fischer, B., and Finn, R. Non-existence theorems and measurement of capillary contact angle. *Zcit AnaL Anwend*., 12, 405-423 (1993).

NASA Tech Brief
Lee, H.S., and Merte, H. Jr. Vapor bubble dynamics in microgravity, report NASA Contract NAS-3-25812. Report No.UM-MEAM-93-10. University of Michigan, Department of Mechanical Engineering and Applied Mechanics. NASA Tech Brief (December 1993).

Proceedings
Cheney, A.B., and Andrews, J.B. "The evaluation of ampule materials for low-g processing of immiscible alloys." Proceedings of the 6th International Conference on Experimental Methods for Microgravity Materials Science, TMS, R.S. Schiffman and J.B. Andrews, eds., 191-197 (1994).

Proceedings
Zhou, W., Wu, J., Dudley, M., Su., C.-H., Volz, M.P., Gillies, D.C., Szofran, F.R., and Lehoczky, S.L. "Characterization of growth defects in ZnTe single crystals." Materials Research Society Proceedings, Infrared Detectors —Materials, Processing, and Devices, A. Applebaum and L.R. Dawson, eds., 299 (1993).

Presentation
Atreya, A., Agrawal, S., Sacksteder, K.R., and Baum, H. "Observations of methane and ethylene diffusion flames stabilized around a blowing porous sphere under microgravity conditions." AIAA-94-0572, presented at the 32nd AIAA Aerospace Sciences Meeting, Reno, Nevada, January 1994.

Presentation
Concus, P. "Equilibrium capillary surfaces: theory and space experiments." American Physical Society. Fluid Dynamics Division Annual Meeting, Albuquerque, New Mexico, November 1993.

Sample only

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National Aeronautics and
Space Administration
George C. Marshall Space Flight Center
Marshall Space Flight Center, AL 35812